SYMBOL SYNCHRONIZER FOR SOFTWARE DEFINED COMMUNICATIONS SYSTEM SIGNAL COMBINER

Abstract

A symbol synchronizer (100) is provided for a software-defined communications system (10). The symbol synchronizer (100), when integrated into either a pre- or post-detection diversity signal combiner (108, 208), enables highly accurate signal synchronization with minimal added system complexity. The symbol synchronizer (100) includes a single complex sliding window matched filter (102) for filtering an input digital signal with a match filtering function based on predetermined signal transfer function characteristics to average out receiver noise from the signal. A signal delay bank (84) includes a plurality of delay blocks each for delaying the digital signal filtered by the single matched filter for a predetermined number of samples. A complex correlator (88) correlates the digital signal filtered by the single complex sliding window matched filter (102) and delayed by the complex correlator (88) with a correlator reference signal, and selects an index of a path having a peak correlator value. As a result of such a configuration, the symbol synchronizer (100) is capable of determining symbol boundaries of channel signals in a multi-channel communications system to enable system signal measurement statistics and demodulated to be more accurately generated.